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# GLOBAL DISEASE ELIMINATION AND ERADICATION AS PUBLIC HEALTH STRATEGIES

PROCEEDINGS OF A CONFERENCE HELD IN ATLANTA, GEORGIA, USA
23–25 FEBRUARY 1998

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# PREFACE

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This Supplement to the *Bulletin of the World Health Organization* presents the Proceedings of the Conference on Global Disease Elimination and Eradication as Public Health Strategies, which was held in Atlanta, GA, USA, on 23–25 February 1998. The Conference was co-sponsored by WHO and many national and international agencies (see Annex C). One of the co-sponsors, the Task Force for Child Survival and Development (TFCSD), also served as the Conference Secretariat. The Conference focused on two main objectives: to evaluate the role of elimination or eradication of diseases in the context of local and global health problems and sustainable health development; and to identify the specific conditions and diseases with the highest potential for elimination and eradication. This Conference was without precedent in terms of the broad expertise and stature of the invited participants and, perhaps more importantly, its aim to examine simultaneously the categories of noninfectious conditions, infectious diseases and health systems, all in relation to the potential for global disease elimination and eradication.

Over 200 invited persons with expertise in international health and selected diseases or health conditions participated in the Conference. These experts represented a broad range of international organizations, academic institutions, other programmes, and countries (see list of participants, Annex B). Their experiences encompassed several key disciplines, including vertically organized disease control and prevention programmes, health systems infrastructure development, basic laboratory research, epidemiology, economics, and behavioural sciences.

The goal of the Conference was to produce practical, concrete recommendations to assist governments, nongovernmental, multinational, and other organizations in their consideration of disease elimination and eradication efforts. Accordingly, the Conference was structured first to provide pertinent background information and perspectives on ongoing elimination and eradication programmes. Participants were then presented with the results of a pre-Conference survey intended to identify potential candidate noninfectious and infectious conditions. This information was used by five workgroups (sustainable health development; noninfectious conditions; and bacterial, viral, and parasitic diseases) to assist in framing their deliberations.

Because of the historical importance of the Conference, the organizers sought to produce in the Proceedings both the spirit and the substance of the meeting. The goal of the editors was to ensure an accurate record of the Conference, while retaining the uniquely diverse expression of each contributor. The published Proceedings therefore present the plenary papers reporting on the background and previous programmes, followed by papers updating ongoing disease elimination and eradication programmes. Papers addressing candidate diseases/conditions for elimination or eradication precede the conclusions and recommendations of each of the five workgroups. The workgroup reports are followed by comments made during open discussion and by a synthesis. The Annexes include detailed fact sheets about specific diseases/conditions for the use by workgroup members. The Conference summary also contains points discussed by a small workgroup, convened in Atlanta on 1–2 June 1998, to consider critical issues identified during the Conference.

Meeting the goals of the published Proceedings, one of the priority outcomes of the Conference, required an extraordinary effort by the contributors and the professional staff of TFCSD and CDC. In particular, we thank Kim Koporc and Richard Conlon for their efforts, and Dr Walter Dowdle for his unfailing support. In addition, we are grateful to Dr Ian Neil, Editor of the *Bulletin of the World Health Organization*, for his flexibility during the development of the Proceedings. Finally, we would like to add our own note of thanks in acknowledging the efforts of many others who were involved in the Conference, including the co-sponsoring organizations, the workgroup rapporteurs, the primary authors of all the other papers, the dedicated staff of TFCSD for their support in facilitating the Conference, Dr Rob Lyerla of CDC, and the experts who developed the fact sheets. The contributions of all these persons and organizations ensured the success of the Conference and the timely development of these Proceedings and should assist in promoting health through the control, elimination, and eradication of disease.

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# ACKNOWLEDGEMENTS

The Conference on Global Disease Elimination and Eradication as Public Health Strategies was the result of the efforts of many individuals, participating organizations, and co-sponsors. The Conference Secretariat, which coordinated the meeting, acknowledges the hard work of the members of the programme planning and arrangements committees, the authors of the fact sheets, and the scientific advisors. We are grateful to the Conference Moderators and Co-Chairs, and to Dr Peter Bell, Dr Nat Bhamarapravati, Dr David Brandling-Bennett, Dr Claire Broome, Dr Denis Broun, Dr Suriadi Gunawan, Dr Mamoun Homeida, Dr Festo Kavishe, Dr Helena Makela, Dr Edward Mbidde, Dr P.R. Narayanan, Dr Peter Ndumbe Jamie Sepulveda and Dr Kean Wang — all of whom helped to keep the Conference on time and on track. We extend our special thanks to the cosponsors of the Conference (listed in Annex C), without whose support and generosity the meeting could not have been held. Although it is not possible to list the names of all the many persons who played critical roles in the success of the Conference, a few deserve special recognition. These include Richard Conlon for his operational skills, creativity, and resourcefulness, and the following members of the Secretariat staff: Corey Anderson, Cheryl Baucrle, Regina Cannon, Amy Gray, Kim Koporc, Karen Lindauer, Pat Richmond, Sara Stefero and Carol Walters, and the graduate student volunteers from Emory University. Finally, we thank Dr Rick Goodman for serving as Editor in Chief of the Proceedings, and for his enthusiastic support, insight, and tireless dedication to the success of the Conference.

*Walter R. Dowdle*, on behalf of the Task Force
for Child Survival and Development,
Conference Secretariat

# ACRONYMS

| | |
|---|---|
| AFB | acid-fast bacilli |
| AFP | acute flaccid paralysis |
| AIDS | acquired immunodeficiency syndrome |
| APOC | African Programme for Onchocerciasis Control |
| AUSAID | Australian Agency for International Development |
| BASICS | Basic Support for Institutionalizing Child Survival |
| BCG | bacille Calmette–Guérin |
| CD | Chagas disease |
| CDC | Centers for Disease Control and Prevention |
| CIDA | Canadian International Development Agency |
| CLD | chronic liver disease |
| CRS | congenital rubella syndrome |
| CTD | Control of Tropical Diseases programme |
| DALDs | disability-adjusted life days |
| DALYs | disability-adjusted life years |
| DANIDA | Danish International Development Agency |
| DEC | diethylcarbamazine |
| DEP | Dracunculiasis Eradication Programme |
| DFID | Department for International Development, United Kingdom |
| DNA | deoxyribonucleic acid |
| DOTS | directly observed treatment, short course |
| DPT | diphtheria–pertussis–tetanus vaccine |
| DPT3 | three doses of DPT vaccine |
| EDTA | ethylenediaminetetraacetic acid |
| EP | elimination/eradication programmes |
| EPI | Expanded Programme on Immunization |
| ERR | estimated rate of return |
| FADNTDs | folic-acid-dependent neural tube defects |
| GDP | gross domestic product |
| GIS | Geographical Information Systems |
| HALYs | handicap-adjusted life years |
| HAV | hepatitis A virus |
| HBV | hepatitis B virus |
| Hib | *Haemophilus influenzae* type B |
| HIS | health information systems |
| HIV | human immunodeficiency virus |
| ICCs | interagency coordination committees |
| ID | iron deficiency |
| IDA | iron-deficiency anaemia |
| IDD | iodine-deficiency disease |
| IEC | Information, education, communication |
| ILO | International Labour Organization |
| ILSI | International Life Sciences Institute |
| IPV | inactivated poliovirus |
| ICMS | International Union of Microbiological Societies |
| JICA | Japan International Cooperation Agency |
| KAP | knowledge, attitude, practices |
| KEMRI | Kenya Medical Research Institute |
| LGA | local government area |
| MCH | maternal and child health |
| MDT | multiple drug therapy |
| MECACAR | international polio effort by 18 countries in the Middle East, Caucasus, and Central Asian Republics |
| MOH | Ministry of Health |
| MSG | monosodium glutamate |
| NCIH | National Council for International Health |
| NGO | nongovernmental organization |
| NGDO | nongovernmental development organization |
| NIAID | National Institute of Allergy and Infectious Diseases |
| NIDs | national immunization days |
| NIH | National Institutes of Health |
| NIS | Newly Independent States of the former USSR |
| NT | neonatal tetanus |
| OCP | Onchocerciasis Control Programme |
| OEPA | Onchocerciasis Elimination Program for the Americas |
| OPV | oral poliovirus vaccine |
| PAHO | Pan American Health Organization |
| PCR | polymerase chain reaction |
| PEM | protein–energy malnutrition |
| PHC | primary health care |
| PHC | primary hepatocellular carcinoma |
| PHS | Public Health Service |
| PPD | purified protein derivative |
| RNA | ribonucleic acid |
| SSPE | subacute sclerosing panencephalitis |
| STD | sexually transmitted disease |
| TB | tuberculosis |
| TFCSD | Task Force for Child Survival and Development |
| TSH | thyroid-stimulating hormone |

| | |
|---|---|
| TT | tetanus toxoid |
| UC | University of California |
| UNAIDS | United Nations Programme on HIV/AIDS |
| UNDP | United Nations Development Programme |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| USD | United States dollar |
| USI | universal salt iodization |
| VAD | vitamin A deficiency |
| VVM | vaccine vial monitor |
| WFPHA | World Federation of Public Health Associations |
| WHO | World Health Organization |
| YF | yellow fever |

# SUMMARY


Maximum control of disease and improvement of health are the goals of every effective public health programme, whether stated or not. Each successful milestone in the reduction of a disease, each new tool for diagnosis and prevention, and each refinement in control strategy allows the establishment of new and more demanding objectives along the path to achieving these goals. Smallpox was eradicated two decades ago, and today programmes are under way to eradicate poliomyelitis and dracunculiasis (guinea-worm disease). The malaria, yellow fever, and yaws programmes in the past failed to achieve eradication, but were associated with appreciable health benefits to many and contributed to a better understanding of the biological, social, political, and economic complexities associated with disease eradication

Achieving the ultimate goal of disease eradication has been the focus of numerous conferences, symposia, workshops, planning sessions, and public health actions for more than a century. The most recent, the 1997 Dahlem Workshop on the Eradication of Infectious Diseases, addressed the science of disease eradication. The Conference on Global Disease Elimination and Eradication as Public Health Strategies extended the Dahlem Workshop findings to consider specific infectious and noninfectious diseases and conditions in the context of sustainable health development and global priorities.

The Conference brought together over 200 participants from 81 organizations and 34 countries. It provided an unprecedented forum for the exchange of ideas among persons with different training, experience, organizational responsibilities, and points of view, each one aiming at the same goal and contributing in some way to reducing the global burden of disease. Participants from local, national, and global levels brought to the Conference a wealth of experiences that encompassed disease control and prevention programmes, health systems infrastructure development, laboratory research, epidemiology, economics, and the behavioural sciences. The Conference considered five major areas: sustainable health development; noninfectious diseases; and bacterial, parasitic, and viral diseases. Key findings and critical issues that emerged during the Conference are summarized below in relation to these five areas.

## Sustainable health development

There are intrinsic and unavoidable tensions between the concepts of eradication and sustainable health development. These tensions arise because of polarization between specific rather than comprehensive goals, and a time-limited rather than long-term agenda. Acknowledging, accepting, and overcoming these tensions are essential if full advantage is to be taken of what each programme can contribute to the achievement of public health goals.

Eradication programmes should have two objectives: eradication of the disease; and strengthening and further development of health systems. Potential benefits for health development should be identified and delineated at the start of any eradication initiative. Measurable targets for achieving the development benefits should be set and the eradication programme held accountable for their realization. Resources for eradication activities should be supplementary to those available for basic health care services. Care must be taken that programmes do not divert resources from basic health services, health development, and other priorities.

Successful eradication programmes are powerful examples of effective management and should incorporate efforts to design programme activities that enhance leadership development and managerial skills which can be carried to other health programmes. Eradication programmes also should aid in the development and implementation of surveillance systems that can be readily adapted to other national priority programmes after eradication has been achieved. Finally, coordination of the development and implementation of eradication efforts with primary care services can produce biological complementarity (e.g. improvement in nutritional status, which may enhance immune responsiveness and resistance to some infectious diseases).

## Noninfectious diseases

The Conference concluded that better control was achievable for certain micronutrient deficiencies (iodine, vitamin A, iron and folic acid), lead intoxication, and silicosis, even though none of these conditions meets the requirements for eradication. Recommendations were made for reducing protein–energy malnutrition and lead intoxication and for accelerating the attainment of global goals for the control of micronutrient deficiencies. Micronutrient supplementation should be enhanced by taking advantage of food fortification and the opportunities presented by the existing health infrastructure and immunization programmes.

**Summary**

## Bacterial diseases

Congenital syphilis, trachoma, and *Haemophilus influenzae* type b (Hib) infection in some countries are candidates for elimination, but no bacterial diseases were judged to be current candidates for eradication. The WHO neonatal tetanus "elimination goal" of <1 case per 1000 live births in every district was considered laudable and attainable. Eradication was considered to be a long-term goal for tuberculosis and Hib infection. Bacterial diseases represent a major disease burden and have substantial research needs before eradication goals can be established. Aggressive action was strongly recommended to improve global control of bacterial conditions.

## Parasitic diseases

Dracunculiasis (guinea-worm disease) eradication is in progress. Although no additional parasitic diseases were considered to be current candidates for eradication, the increasing availability of potent, long-acting drugs brings extraordinary opportunities for overcoming onchocerciasis and lymphatic filariasis, and the effectiveness of the strategy for controlling the triatomid vectors provides similar opportunities for American trypanosomiasis (Chagas disease). The workgroup concluded that onchocerciasis (river blindness) and lymphatic filariasis (caused by all *Wuchereria* and most *Brugia* infections) could be eliminated and possibly eradicated in the future. For the 5% of cases of lymphatic filariasis caused by *Brugia malayi*, which also has an animal reservoir (in South-east Asia), elimination of disease, but not infection, is feasible. Similarly, for Chagas disease where animal reservoirs exist, elimination of disease, but not infection, is feasible.

## Viral diseases

Poliomyelitis eradication is in progress. Measles and rubella were concluded to be possible candidates for eradication within the next 10–15 years. Measles transmission appears to have been interrupted for various periods in many countries in the Americas; elimination has not yet been demonstrated in other regional settings. The workgroup recommended that developed countries should proceed with elimination of measles as a step towards eradication. In other countries, accelerating measles control should be the priority, especially in areas with high mortality. Developing countries should proceed cautiously to more costly measles elimination programmes to avoid undermining the poliomyelitis eradication effort. Experience gained from regional and country interventions should be used to refine the strategies for eventual eradication.

The eradication of rubella as an add-on to measles eradication was felt to be biologically plausible. However, several issues first need to be addressed, including the burden of rubella disease (human and financial), the marginal cost of adding rubella to a measles eradication effort, and demonstration that elimination is programmatically feasible and sustainable in a large geographical area.

The workgroup urged stronger international efforts to control rabies, yellow fever, and Japanese encephalitis by using existing measures, but none of these diseases was considered suitable as a candidate for eradication because of the existence of a nonhuman reservoir. Viral hepatitis A eradication was concluded to be biologically feasible but further demonstration of sustainable elimination was first required.

Viral hepatitis B was not considered to be a current candidate for eradication because of the multi-generation programme necessary to overcome the effect of long-term virus persistence. However, the workgroup recommended immunization in all countries to maximize the likelihood of eliminating transmission of hepatitis B virus.

## Conclusion

The Conference provided a multidisciplinary forum for addressing issues related to disease elimination and eradication and their relationship to sustainable development in health. There was widespread agreement that an eradication programme could have many positive effects on health systems development and that explicit efforts should be made to maximize these positive effects as well as minimize any negative effects. Community mobilization and organization should be seen as a component of sustainable health development, with the additional potential for disease control and eradication. Poliomyelitis and dracunculiasis eradication efforts are already under way. Measles and rubella are possible candidates for eradication. Congenital syphilis, trachoma, and Hib infection are candidates for elimination in some countries. River blindness (onchocerciasis) and lymphatic filariasis (*W. bancrofti*) could be eliminated and possibly eradicated at some time in the future.

Discussions in the final plenary session centred on concerns about the misuse and misunderstanding of the term elimination, since this term is often not clearly distinguished from eradication. Also addressed was the need to bring the findings of the

Conference to other forums to expand discussion of international health goals and strengthen the mutual ties between sustainable health development and disease control and eradication efforts. Finally, the Conference suggested that a small group convene to further address the topic of definitions and to identify next steps for disseminating and implementing the recommendations of the Conference (see report on p. 113).